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Vincetoxicum yonakuniense, a New Combination of Asclepiadaceae and its New Distribution Record on Senkaku Islands, Ryukyu Archipelago

TADASHI YAMASHIRO[1]*, YOICHI TATEISHI [2] and MASAYUKI MAKI[3]

[1]Biological Institute, Graduate School of Science, Tohoku University, Aoba, Sendai, 980-8578, Japan; [2]Department of Science Education, Faculty of Education, University of the Ryukyus, Nishihara, 903-0213, Japan; [3]Division of Ecology and Evolutionary Biology, Graduate School of Life Sciences, Tohoku University, Aoba, Sendai, 980-8578, Japan

Cynanchum yonakuniense, a perennial twining herb, endemic to Yonaguni Island, the Ryukyu Archipelago has never been recorded since its original materials collected there. We rediscovered it on the island and moreover found a herbarium specimen of the species on Senkaku Islands in the same archipelago. In this paper we added the morphologies of root, fruit and seed to the description of this species. On the basis of morphological re-examinations, we propose a new combination *Vincetoxicum yonakuniense.*

Key words: Asclepiadaceae, *Cynanchum yonakuniense*, new combination, Ryukyu Archipelago, *Vincetoxicum*

Cynanchum yonakuniense has been known as a perennial twining herb endemic to Yonaguni Island in the Ryukyu Archipelago (Fig. 1). This species was described by Hatusima (1977) based on a flowering specimen. Since then, it has never been collected and its fruits and seeds have never been observed (Yamazaki 1993). This species is listed on the national list of threatened plants in Japan as "critically endangered" to extinction (Environment Agency of Japan, 2000).

Recently, we rediscovered *Cynanchum yonakuniense* from Yonaguni Island. Moreover, we found out a specimen of this species collected on Uotsuri Island, Senkaku Islands in the Ryukyu Archipelago. In this study, we revise the descriptions of morphological characters and report a new locality of *C. yonakuniense*. Based on the observations on these materials, we propose a new combination under *Vincetoxicum* Wolf for the species.

In Yonaguni Island, we found *Cynanchum yonakuniense* at two localities: Tabaru and Mt. Kubura-dake (Fig. 1). At Tabaru, only three individuals were found on damp grassland dominated by *Pennisetum purpureum* near paddies. At Mt. Kubura-dake, we found 13 individuals growing on an edge of an evergreen forest along a road at altitudes 50-120 m. Flowering and fruiting plants were found on both sites.

In addition, we found out a specimen of *Cynanchum yonakuniense* (*K. Shinjo 7272*, URO)

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* Author for correspondence: Phone & Fax: 022-217-6690. E-mail: gusuku@mail.cc.tohoku.ac.jp.

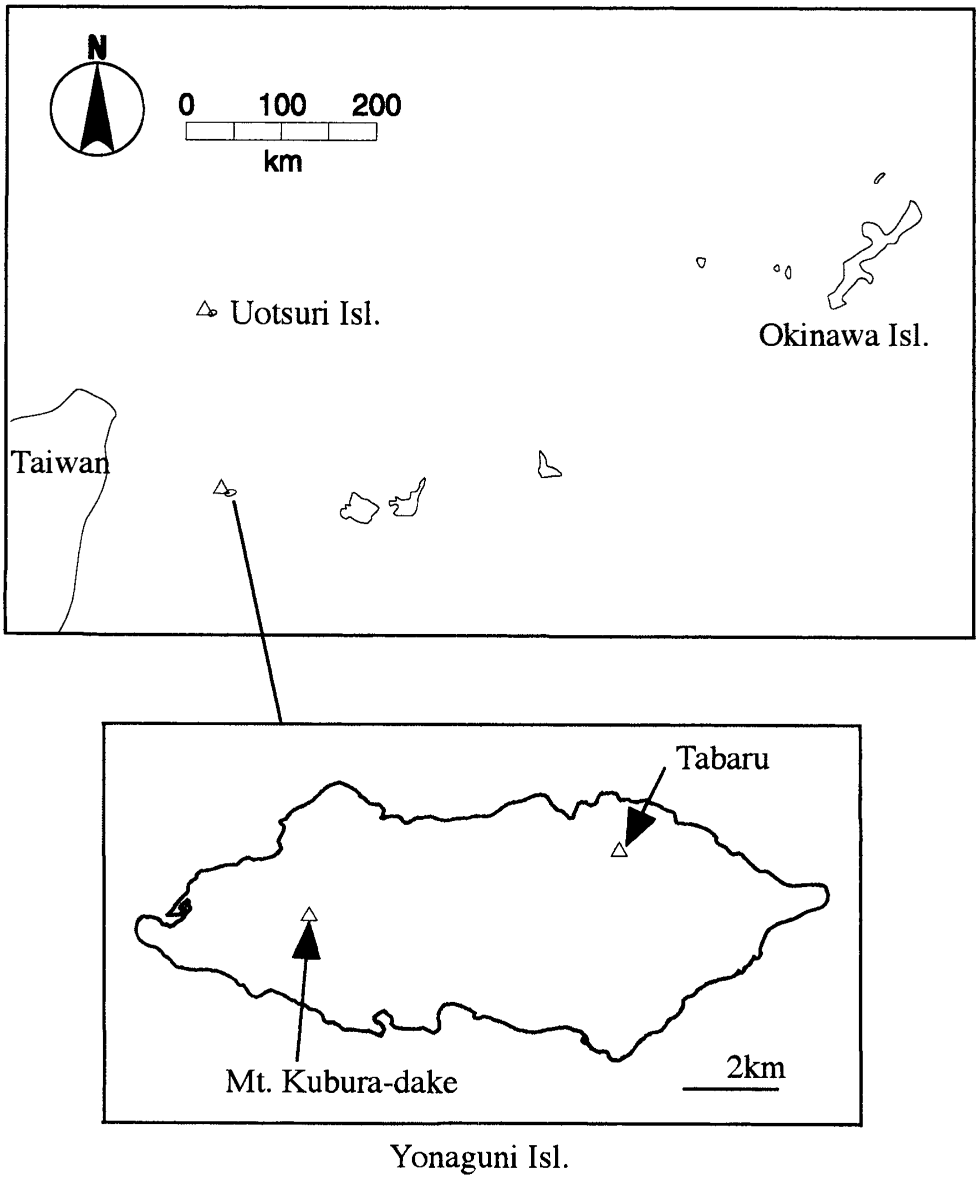

FIG. 1. Distribution map of *Vincetoxicum yonakuniense*. Open triangles indicate distribution of *V. yonakuniense*.

on Uotsuri Island from the collection made by Mr. Shinjo. The flower morphology of the specimen agreed with those of *C. yonakuniense*.

So far, this species has taxonomically been classified in *Cynanchum* L. Recent studies on morphology and chemical constituents of *Cynanchum s. l.* by Qiu *et al.* (1989) and Liede (1996) revealed that this genus is not monophyletic. They divided *Cynanchum s. l.* to two genera, *Vincetoxicum* and *Cynanchum s. s.* Thus, transference of many Japanese species of *Cynanchum* to *Vincetoxicum* were carried out (*e. g.* Kitagawa 1959, Ohashi 1990). Yamazaki (1993) treated, however, *Vincetoxicum* as a section of *Cynanchum*, and included *C. yonakuniense* in the section *Vincetoxicum*.

Vincetoxicum characterized by a short and erect rhizome bearing fibrous roots and five lobed fleshy corona without triangular appendage. In contrast, *Cynanchum* has tuberous or ascending rhizome with roots not fibrous (Qiu *et al.* 1989, Liede 1996). Corona of *Cynanchum* is tubular or deeply five lobed, and the lobes are membranaceous or fleshy, and if fleshy, they have a triangular appendage on adaxial side.

Cynanchum yonakuniense has a short and erect rhizome with fascicled roots (Fig. 2A). The corona of this species is deeply five lobed, and each lobe is fleshy, triangular ovate without appendage on adaxial side, and is adnate at 2/3 length with the abaxial side of the stamen (Fig. 3D-E). We agree with Qiu *et al.* (1989) and Liede (1996) in separating *Cynanchum s.s.* and *Vincetoxicum*, and thus we transfer *C. yonakuniense* to *Vincetoxicum* as seen below.

Vincetoxicum yonakuniense (Hatus.) T. Yamashiro & Y. Tateishi **comb. nov.**

Cynanchum yonakuniense Hatus. in J. Phytogeo. Tax. 25: 26 (1977). Hatus. & Amano, Fl. Ryukyus: 114 (1977), 2nd ed.: 176 (1994). Shimabuku, Vasc. Fl. Ryukyu Isls.: 370 (1990); rev. ed.: 430 (1997). T. Yamaz. in K. Iwats. *et al.* (eds.), Fl. Jap. 3a: 175 (1993).

Tylophora sp. Hatus. & Kanai in Mem. Nat. Sci. Mus. Tokyo (7): 118 (1974).

Tylophora yonakuniensis Hatus., Fl. Ryukyus, rev. ed. 890 (1975), nom. nud. (descr. Japon.)

Type: Isl. Yonakuni, Ryukyus, 30 Sept. 1973, S. Hatsusima 35657 (RYU non vidi, photocopy in KAG!)

A perennial twining herb up to 2 m long. Rhizome short and erect. Roots fascicled (Fig. 2A). Stems terete, 1-2 mm in diameter, sparsely pubescent along 1 or 2 lines with short curved hairs or glabrous. Leaves opposite, membranaceous to chartaceous; petiole 1-2.8 cm long, sparsely pubescent with short curved hairs above; blade ovate, 2.5-8 cm long, 1.5-5 cm wide, glabrous on both sides, sometimes sparsely ciliate with curved short hairs, apex acute to obtuse and shortly apiculate, base shallowly cordate, truncate or rounded. Inflorescence

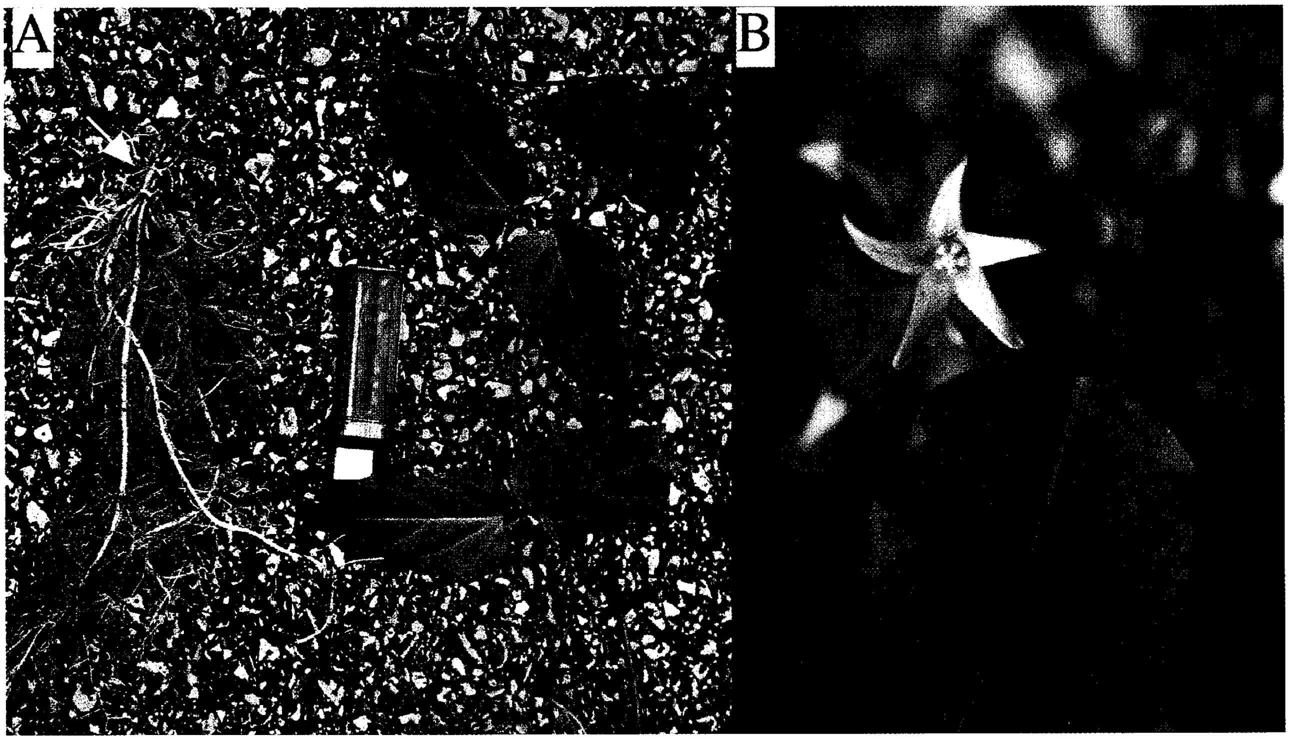

FIG. 2. Flowering individual of *Vincetoxicum yonakuniense*. A: Stem, rhizome and roots. Arrow indicates rhizome. B: Flowers.

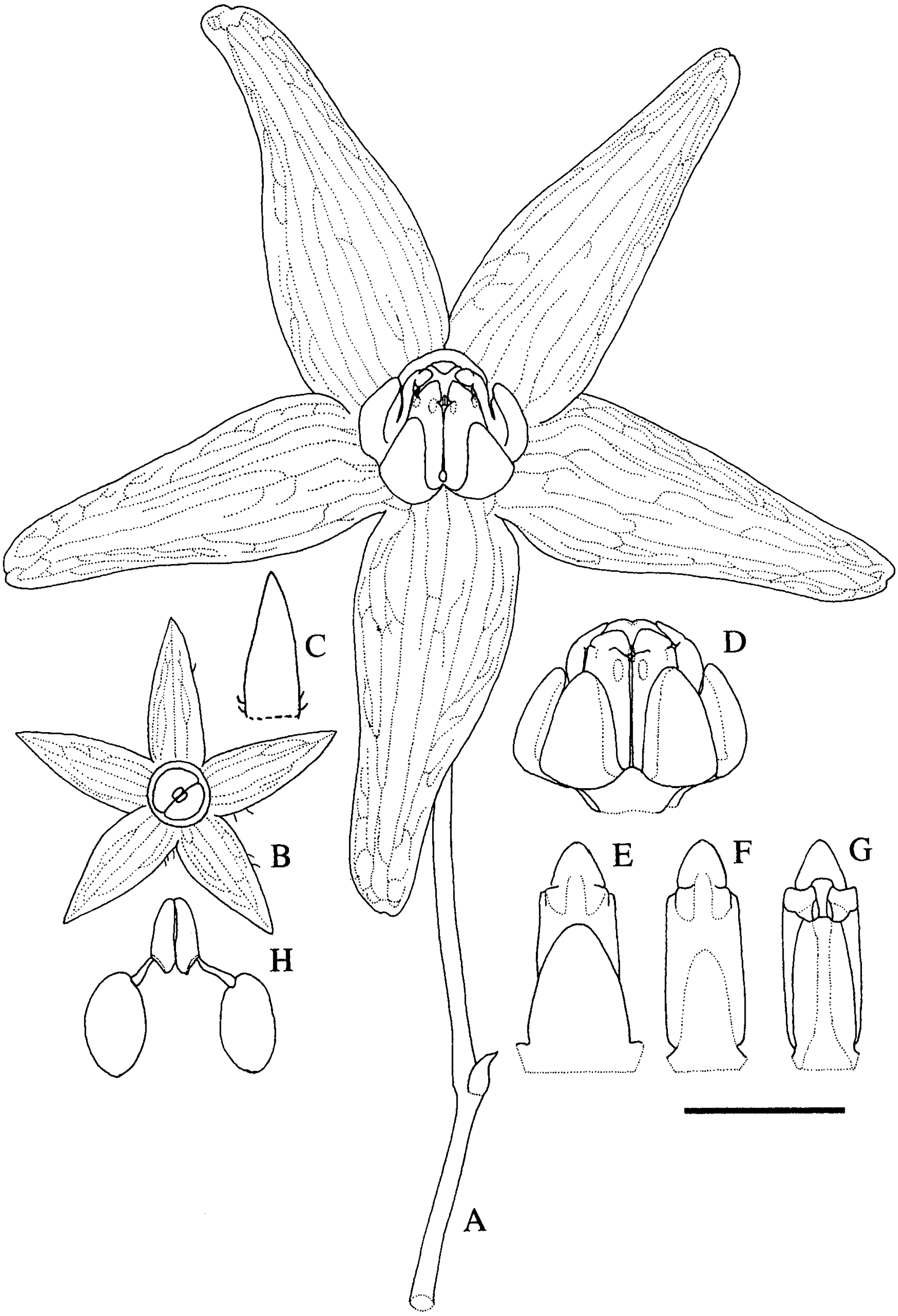

FIG. 3. Flower of *Vincetoxicum yonakuniense*. A: whole flower. B: adaxial view of calyx and pistil; corolla, corona and stamens are removed. C: abaxial view of calyx lobe. D: corona and gynostegium. E: abaxial view of stamen and corona lobe. F: abaxial view of stamen; corona lobe is removed. G: adaxial view of stamen. H: pollinarium. Scale bar represents 3 mm for A-C, 2 mm for D-G and 400μm for H.

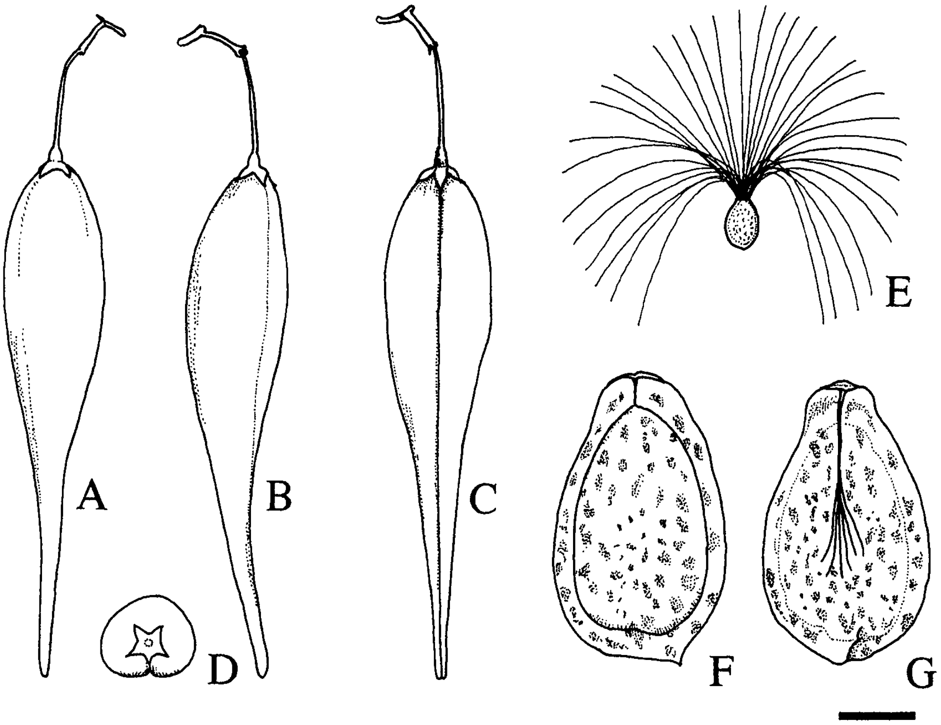

FIG. 4. Follicles and seeds of *Vincetoxicum yonakuniense*. A: abaxial view of follicle. B: lateral view of follicle. C: adaxial view of follicle. D: basal view of follicle. E: seed with coma. F: dorsal view of seed, coma is removed. G: ventral view of seed, coma is removed. Scale bar represents 1 cm for A-E and 2 mm for F, G.

axillary, umbellate-cymose, 1-5 flowered; rachis 6-19 mm long, glabrous. Pedicel slender 8-16 mm long, glabrous. Flower (Fig. 2B & 3) pale greenish yellow or sometimes pale reddish yellow. Calyx rotate, 5-6.5 mm across, deeply 5-lobed; lobes lanceolate, 2.2-3.2 mm long, ca. 1 mm wide, glabrous or sparsely pubescent on abaxial side. Corolla (Fig. 3A) rotate, deeply five-lobed, 18-25 mm across; lobes lanceolate, glabrous on both surfaces, 7.5- 11.5 mm long, 3-3.5 mm wide. Corona (Fig. 3D) shorter than gynostegium, deeply five-lobed; lobes fleshy, deltoid-ovate, ca. 1.2 mm long, 1 mm wide, adnate in 2/3 length with the abaxial side of the stamen, glabrous. Stamen (Fig. 3E-G) ca. 2 mm long, 0.7 mm wide; anther wings ca. 1.3 mm long; connective appendages 0.5 mm long, 0.5 mm wide, broadly ovate. Pollinarium (Fig. 3H): corpuscula brownish, 0.24 mm long; caudicula 0.1 mm long, cylindrical; pollinia 0.22 mm long, 0.18 mm wide, subapically attached to the caudicles. Follicles (Fig. 4A-D) lanceolate in outline, 5.5-7 cm long, 0.9-1.4 cm wide, glabrous. Seeds (Fig. 4E-G) blackish brown, black-speckled, flat, ovate, 6.5-8 mm long, 4-5.2 mm wide, with comae ca. 25 mm long.

Distribution: Ryukyus: Yonaguni and Uotsuri Islands. Endemic.

Specimens examined: Ryukyus: Yonaguni Isl. near Tobaru (*S. Hatusima 35657,* 29 Sep.-3 Oct. 1973. KAG-Photocopy of the holotype specimen); at the foot of calcareous cliff south of air field, alt. 10 m (*S. Hatusima et al.* 2 Oct. 1973. TI & TNS); Mt. Kubura-dake (*T. Yamashiro & S. Ujiie 4188*, 12 Dec. 1998. URO); Tabaru (*T. Yamashiro & S. Ujiie* 4199, 12 Dec. 1998. URO). Uotsuri Isl. (*K. Shinjo 7272*, 29 May-7 Jun. 1979. URO).

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